Buchem, Ilona; Leiba, Moshe (2021) JOIN IN & BREAK-OUT! Sustaining Internationalisation in Higher Education Through a Virtual Exchange in Times of the COVID19 Pandemic, ICERI2021 Proceedings, pp. 160-169. doi: 10.21125/iceri.2021.0094. Retrieved from https://library.iated.org/view/BUCHEM2021JOI

JOIN IN & BREAK-OUT! SUSTAINING INTERNATIONALISATION IN HIGHER EDUCATION THROUGH A VIRTUAL EXCHANGE IN TIMES OF THE COVID19 PANDEMIC

I. Buchem[1], M. Leiba[2]

[1]Beuth Hochschule für Technik Berlin (GERMANY)
[2]Academic College of Tel-Aviv Yaffo (ISRAEL)

Abstract

Virtual exchanges have become a popular way of internationalising higher education in face of an ever-increasing globalisation and mobility. Virtual exchanges have proved especially valuable in times of COVID19 as they allow to bring faculty and students from different countries without the need for travelling. This paper describes how an open virtual exchange with over 200 students from two universities in Germany and Israel in the summer term 2021 was integrated into the curricula and which learning outcomes were fostered through online, international exchanges in synchronous settings. The virtual exchange described in this paper is an example of a structured intercultural project-based peer-collaboration, in which international teams of students worked together on projects and shared their outcomes during synchronous breakout sessions in small groups. The aim was to bring students together to learn from each other, give and receive peer-feedback and reflect on the content of the curricula and the intercultural aspects. This paper describes the integration of the virtual exchange into the curricula to provide best possible alignment of objectives, methods and results. Following the conceptual part, the paper presents the results of the quantitative online survey with 148 students who participated in the exchange. The results of the survey reveal hardly any significant national differences in experience of the virtual exchange. More importantly, the differences related to how the students value their experience in a virtual exchange in relation to internal motivation, intuitive use and efficiency are significantly related to previous experiences in international contexts and to previous experience in using the English language.

Keywords: virtual exchange, international collaboration, internationalisation, higher education, project-based learning.

1 INTRODUCTION

Virtual exchange refers to the engagement of a group of students who are geographically separated, in online intercultural interactions mediated by technology-enabled activities, focused on communication and interaction, with support of educators [1]. Virtual exchanges have become a popular way of internationalising higher education, especially in face of an ever-increasing globalisation and mobility. Virtual exchanges have proved particularly valuable in times of COVID19 as they have allowed to bring faculty and students from different countries without the need for travelling.

There are many different forms of international, virtual collaboration. For example, a literature review conducted by [1] proposed six different forms of virtual exchanges, i. e. tele-collaboration, online intercultural exchange, collaborative online international learning (COIL), global virtual teams, globally networked learning environments, and e-tandem or tele-tandem [1]. Some other forms of virtual collaboration have been defined in the context of mobility in higher education. For example, the mobility matrix by [2] identified virtual exchanges as one of the three central forms of academic mobility next to physical exchange and open virtual exchange. In this context, a virtual exchange has been defined as an exchange by online mobility, following similar rules as a physical exchange and always with bilateral or multilateral agreements between participating organisations [2]. Open virtual mobility has emerged as a new concept only recently and was first proposed by the Open Virtual Mobility Erasmus+ project, as a less formalised form of a virtual exchange, compared to virtual exchanges as defined by [2], which require bilateral or multilateral agreements between participating organisations. Open virtual mobility concept refers to open exchange formats without the need for institutional agreements [3] and has been defined as short or long term international academic experiences through online courses or other learning activities [2]. Such open virtual exchanges usually draw upon diverse open educational practices (OEP) such as open courses (e. g. MOOCs, SPOCs), open educational resources (OERs) and open badges (OBs) and support international collaboration between staff and students without formal, organisational agreements [4]. From this perspective, open virtual exchanges aim at providing international academic experiences through various forms of open online learning activities using web-based tools and learning environments. Examples of open virtual exchanges have been showcased in a number of publications including [5, 6, 7]. In the example by [5], students from Bentley University in the United States and students from Polytechnic University of Timisoara in Romania worked together in a joint learning environment on evaluating online collaboration tools. The instructors provided a virtual space for students to meet, socialize, exchange information, develop, and publish their results online. In the example by [6] students from four universities in Germany, i.e., University of Paderborn, Beuth University of Applied Sciences Berlin, Technical University Braunschweig, Heinrich Heine University Düsseldorf, and two universities in Israel, i.e., Holon Institute of Technology, Levinsky College of Education, collaborated in international and interdisciplinary teams on designing mobile learning applications. The instructors used a wide range of web-based tools to enhance the collaboration in teams, such as team wikis (PBWorks), web conferencing (Adobe Connect, FlashMeeting, Skype), team blogs (Wordpress) and microblogging (Twitter). In the example by [7] students from Fevale University in Brazil, Beuth University in Germany, and Montpellier SupAgro in France explored intercultural aspects through online collaboration using a range of web-based tools such as WhatsApp and Skype. Also in this example, the participating instructors created a joint learning space for students in the form of an online community using Google+ as a digital tool for conversations and interactions. In all the examples listed above, open virtual exchanges were set up at the initiative of the educators, anchored in the course curricula, ran with the help of freely available web-based tools, and implemented without institutional agreements between participating universities.

This paper describes the learning design of an open virtual exchange in the summer term 2021 with over 200 students from two universities in Germany and Israel and outlines the key learning outcomes which were fostered through online, international exchanges in synchronous settings of live online meetings in the web-conferencing system Zoom. This paper describes how the open virtual exchange, including the synchronous sessions in breakout rooms, was integrated into the curricula to provide best possible alignment of objectives, methods and results following the constructive alignment model by [8]. Following the conceptual part, the paper presents the results of the quantitative online survey with 148 students who participated in the exchange and responded to the survey. The results of the survey reveal individual perceptions of students from both countries related to the benefits, value-added, issues, cultural aspects, and outcomes, as well as student assessment of the design of the virtual exchange. This paper ends with conclusions and recommendations for further research.

2 DESIGN OF THE VIRTUAL EXCHANGE

The open virtual exchange described in this paper was an international collaboration during the summer term of 2021 between two courses: the Learning Design course in 6th semester of the BSc study program in Digital Business at Beuth University of Applied Sciences in Berlin, Germany and the Human Computer Interaction (HCI) course in 4th semester of the BSc study program in Information Systems at The Academic College of Tel-Aviv Yaffo, Israel. The main objective of the virtual exchange was to create an opportunity for students during the COVID-19 pandemic to foster experience in communicating and collaborating with students from other countries on the subject matter taught in participating study programs. Another objective was to allow students to engage in a learning activity other than traditional online learning formats popular during the pandemic, which mostly focused on individual engagement with the learning content provided by teachers. The virtual exchange was initiated by the course instructors who collaborated as researchers and as teachers for a number of years previous to the virtual exchange. No formal bilateral agreement between the participating organisations was strived for since from the very beginning the collaboration was planned to keep the administrative effort to a minimum, in this way allowing to focus the attention and allocate the time on real-time interactions between students. The virtual exchange was integrated into the curricula of both participating courses, i. e. the virtual exchange was embedded in the description of the learning outcomes, teaching and learning activities and the assessment. Although the participation was not compulsory, students could earn points for participation in the virtual exchange and these points counted for the final grade in the course. The virtual exchange took place fully in the English language which was a foreign language for both student cohorts. In this way the virtual exchange also aimed at applying English in authentic situations.

The virtual exchange was designed following the Collaborative Online International Learning (COIL) approach to designing virtual mobility. The Collaborative Online International Learning (COIL) approach involves instructors in the partner universities, who design their courses, usually with similar content, so that the two or more student populations from different countries can engage in online communication and collaboration together both synchronously (in real time) or asynchronously (not in real time) [1]. At the same time, the virtual exchange was designed as a structured peer-collaboration. Structured collaboration is a special collaboration format which includes instructions about the process of collaboration, e. g. about the sequence of meetings and rules for participation including instructions on how to present and how to give peer-feedback. Structured collaboration tends to support information exchange, improves learning outcomes, and enhances alignment with the task [9]. Moreover, the virtual exchange followed a project-based approach with teams of students working on local projects and sharing their outcomes during synchronous online sessions in breakout-rooms in Zoom. The aim of these synchronous sessions in Zoom was to bring students together to learn from each other, present their ideas and outcomes, give, and receive peer-feedback, and reflect on the content of the curricula and the intercultural aspects related to both the project and the collaboration.

During the virtual exchange teams of students in Berlin and Tel Aviv worked on their local projects on the same topic. The project-based assignment in both courses was to design an online course as a new business opportunity in times of COVID-19. The lecturers created a similar structure for the curricula in both courses to align learning outcomes, teaching and learning activities and assessment following the principles of the constructive alignment [8] approach both inside the local courses as well as between the courses in two countries. The intended learning outcomes in both courses included a set of competencies related to generating a business idea and designing an online course, teamwork and communication in international teams, linguistic and intercultural competencies, and digital competencies related to making use of web-based tools for synchronous online communication and creation of designs such as mockups with freely available prototyping tools. The teaching and learning activities in both courses were aligned to the expected learning outcomes and included the exploration of topics and designs of existing online courses, business idea generation related to online courses for national and international audiences, iterative teamwork on design activities in the realm of instructional design which included ethnographic research and requirement analysis, applying selected instructional design models and creating mockups to visualise design ideas. The assessment of student performance in both courses was aligned with intended learning outcomes and the teaching and learning activities were designed to allow students to develop and assess intended competencies. The assessment followed a team-based approach which focused on the assessment of the quality of joint effort in local teams as well as the quality of communication in international teams, especially in relation to providing peer-feedback. Some elements of the learning design of the virtual exchange based on the model of constructive alignment by [8] were slightly modified for the local courses in alignment with the specific profile of the study program and the existing curriculum. For example, the focus of teaching and learning activities in the module “Learning Design” in Berlin was on designing an online course using selected instructional design models, while the focus in Tel Aviv was on designing a learning/teaching functional mockup application/website using UX/UI design principles and tools.

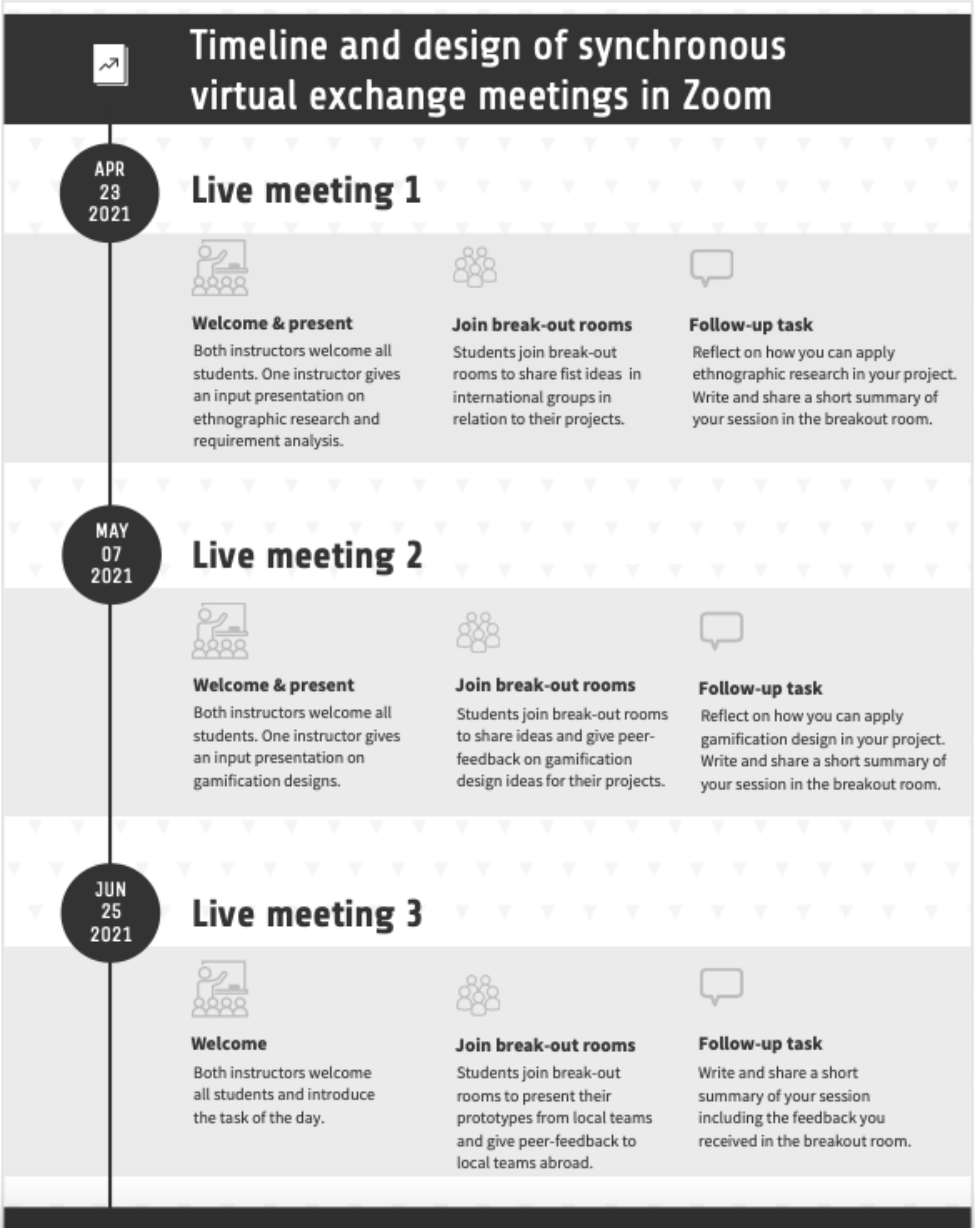
One specific teaching and learning activity was applied in both courses to align with the joint learning outcomes and assessment of/for learning. To enhance real-time student collaboration for exchange of ideas, methods and results related to project work, three live meetings in Zoom were organised during the semester: one at the beginning, one in the middle and one in the end. The first live meeting was dedicated to ethnographic research and eliciting requirements as initial stages in the design of an online course. The second meeting was dedicated to gamification design as a special method to enhance engagement and support positive learner experience in an online course. The last meeting was dedicated to presenting prototypes developed in local student teams and providing peer feedback. Each live meeting started with a short input from one of two instructors and was followed by collaboration in smaller, international groups in breakout rooms in Zoom. The structured collaboration approach in designing synchronous meetings in Zoom was reflected in the agenda and instructions provided for each meeting. The instructions encompassed rules for participation and hints on providing peer-feedback. An example agenda and instructions for the third meeting visualise the structured collaboration approach and are summarised in Table 1.

Table 1. Structured collaboration approach in the virtual exchange. Example agenda and instructions.

Elements of structured collaboration	
Agenda for meeting 3 on Friday 25.06.2021 09:00 - 10:00 CEST	Part I: 5 min opening Part II: 50 minutes group activity: ● 5 minutes pitch per group ● 5 minutes feedback ● 5 presentations in 1 break out room Part III 5 minutes closing with survey
Points for your presentation	Duration: 5 minutes per group Rules to follow: ● Presentation should be in English ● Make sure all people in the group contribute to the presentation ● Show one scenario (you can show interactively or as a set of screens) Address these questions: ● What is the aim of your online course? ● What is your target group? ● What is the problem you are trying to solve? ● Why should people use it? ● What is the business opportunity? ● How could you assess the usability of your course? ● Which methods/tools could you use?
Points for giving feedback	Duration: 5 minutes per group Each person in the group has to ask at least one of the questions: ● Do you think there is a market for this online course? ● What do you think about the design of the course? ● What do you think about the information architecture (navigation, search, information)? ● What you liked/did not like about the scenario? ● Do you think you have a need for this online course in your context/country/culture? ● Can you suggest a different methodology to examine usability? ● What are your suggestions to improve the online course?

In order to assemble students from both countries in each break-out room, students were assigned to rooms before each session. The results from the exchange in breakout-rooms in Zoom were reflected in local groups and the reflections of German students were reported on in short posts by a representative of each team from Berlin in their local course in the learning management system Moodle using the discussion forum as a communication tool. In this way all students from the course in Berlin could learn about what was presented and discussed in other breakout-groups shortly after each session. The students from Israel uploaded their presentations in their local course in the learning management system Moodle using the discussion forum as a communication tool as well.

Figure 1 below summarises the design of the three synchronous virtual exchange sessions in Zoom, including the interaction in small, international groups in break-out rooms.



Timeline and design of synchronous virtual exchange meetings in Zoom

APR 23 2021

Live meeting 1

Welcome & present
Both instructors welcome all students. One instructor gives an input presentation on ethnographic research and requirement analysis.

Join break-out rooms
Students join break-out rooms to share fist ideas in international groups in relation to their projects.

Follow-up task
Reflect on how you can apply ethnographic research in your project. Write and share a short summary of your session in the breakout room.

MAY 07 2021

Live meeting 2

Welcome & present
Both instructors welcome all students. One instructor gives an input presentation on gamification designs.

Join break-out rooms
Students join break-out rooms to share ideas and give peer-feedback on gamification design ideas for their projects.

Follow-up task
Reflect on how you can apply gamification design in your project. Write and share a short summary of your session in the breakout room.

JUN 25 2021

Live meeting 3

Welcome
Both instructors welcome all students and introduce the task of the day.

Join break-out rooms
Students join break-out rooms to present their prototypes from local teams and give peer-feedback to local teams abroad.

Follow-up task
Write and share a short summary of your session including the feedback you received in the breakout room.

Figure 1. Timeline and design of synchronous virtual exchange sessions.

3 EVALUATION STUDY

The virtual exchange was evaluated using a quantitative approach of summative evaluation. The key research question guiding the study was related to the exploration of differences in the perception of the virtual exchange: What are the differences in the evaluation of the virtual exchange? The particular interest of the study was to explore in what way students with varying experience (international and english) and from different localities (Germany and Israel) differed in the evaluation of their learning experiences during synchronous sessions, especially interactions in breakout rooms.

The online survey was designed using the online survey tool SurveyMonkey. The survey included four groups of questions with 16 questions in total: Part I Socio-demographic data (4 questions); Part II Communication in international groups (3 questions); Part III Learning Design of the virtual exchange (7 questions); Part IV Personal value-added from the virtual exchange (2 questions). Items in Part I Socio-demographic data encompass standard information related to the country of origin, age, and gender of students as well as one item related to previous international experiences such working in international teams and previous experience in communicating in the English language. Part II Communication in international groups were used to evaluate learner experience. These items were derived from the User Experience Questionnaire (UEQ), an end-user questionnaire to measure user experience in context of software products [10] and adjusted to the context of the virtual exchange. Items in Part III Learning Design of the virtual exchange were designed by the instructors to capture perceptions of students related to the specific elements of the learning design of the virtual exchange such as the number and the duration of the synchronous meetings or number of students in breakout-rooms in each meeting. Items in Part IV Personal value-added from the virtual exchange were designed by the instructors to explore which elements of the virtual exchange appeared especially valuable to students. The last part also included a request to provide a testimonial for which could be used to attract students to join a virtual exchange next time.

The online survey was conducted with participating students at the end of the third live meeting. The students were given approx. 10 minutes to fill in the questionnaire before the end of this last meeting. Altogether 148 students out of approx. 200 students participated in the online survey. Table 2 gives an overview of the characteristics of the study sample.

Table 2. Characteristics of the study sample.

Socio-demographic categories	***Study sample***
Country of origin	50% Germany (n = 74) 50% Israel (n = 74)
Age	52% 18-24 years (n = 77) 48% 25-34 years (n = 71) 0% other categories
Gender	51% male (n = 75) 49% female (n = 73) 0% other
Previous experience (1 = very weak, 5 = very strong)	International experience Average = 3.01 English language experience Average = 3.72

4 RESULTS

In this section we describe the results of the online survey with 148 students from Israel and Germany. The data analysis was an exploratory and iterative process. To analyse the survey data, IBM SPSS Statistics software (version 28) was used to code, categorize, and conduct the data analysis.

4.1 Student perceptions about the virtual exchange in breakout rooms

The students met three times throughout the semester, while communicating directly in the international groups for 30 minutes each time in breakout rooms. Part II of the online survey was derived from the User Experience Questionnaire (UEQ), an end-user questionnaire used to measure user experience in the context of software products [10]. The items from UEQ were adjusted in wording and number to the context of the virtual exchange. The diverse aspects of international communication were examined using self-constructed items.

4.1.1 Experience of the virtual exchange

The first step in the analysis of data was to explore the experience of the participants in the virtual exchange based on the items derived from the User Experience Questionnaire (UEQ). An exploratory factor analysis was performed on the 11 aspects of international communication and the results of the descriptive analysis are summarised in Table 3. The analysis identified underlying dimensions of international communication as perceived by the respondents. The Kaiser-Mayer-Olkin (KMO) Measure of Sampling Adequacy (which indicates whether the sample size is adequate for performing factor analysis and varies from 0 to 1) was 0.90, comfortably higher than the recommended level of 0.6 [11]. The following rules were applied to the factor analysis: (a) principal components extraction (a method to extract factors generally used for data reduction) with direct Oblimin rotation; (b) minimum eigenvalue of one as a cutoff value for extraction; (c) deleted items with factor loadings less than 0.31 on all factors. According to the above criteria, a solution with three factors was extracted explaining 71.76% of the variance (Table 3). This result indicates that the adapted UEQ items are fit for purpose and can measure learner experience in virtual exchanges in an appropriate way. The iterative process of interpretation of the factor analysis led to the refinement of the survey and a more parsimonious solution, with three factors representing parameters of international learner experience.

Table 3. Descriptive statistics and factor analysis result, n = 142.

Items	***Mean***	***SD***	***Factor loadings***	***Factor's title***	***Total variance explained (%)***
Value	4.54	.740	.926	Internal Motivation	53.01%
Motivation	3.89	.943	.787		
Excitement	3.99	.945	.761		
Joy	4.06	.936	.756		
Practicality	4.08	.938	.731		
Interest	3.76	1.045	.703		
Friendliness	3.67	1.159	.751	Intuitive Use	63.34%
Understanding	3.70	1.016	.701		
Ease	3.76	1.024	.698		
Clarity	3.47	1.083	.800	Efficiency	71.76%
Organization	3.60	1.032	.777		

The extracted solution consisted of three factors: (a) Internal motivation: Value, Motivation, Excitement, Joy, Practicality, and Interest; (b) Intuitive use: Friendliness, Understanding and Ease; and (c) Efficiency: Clarity and Organization. The factor loading was similar to the Experience Questionnaire (UEQ) with minor changes adapted to the virtual exchange. We examined the correlation between the factors and the varying experience (International and English) and different localities (Germany and Israel) (Table 4). Students with more International Experience have a higher Internal Motivation (M=3.83, SD=0.84) (Rs=0.355, p<0.01), higher Intuitive Use (M=4.14, SD=0.7) (RS=0.242, p<0.01) and a higher Efficiency (M=3.53, SD=0.95) (RS=0.256, p<0.01). Students with more English Experience have a higher Internal Motivation (Rs=0.275, p<0.01), higher Intuitive Use (RS=0.358, p<0.01) and a higher Efficiency (RS=0.195, p<0.01). Locality wise, no differences were found between students from Israel and students from Germany in relation to the three factors: Internal Motivation [t(140)=-1.261; p>0.05], Intuitive Use [t(140)=0.046; p>0.05], and Efficiency [t(140)=-0.357; p>0.05].

Table 4. Spearman's Correlations: international communication and experience.

Variable	***International Experience (Rs)***	***English Experience (Rs)***
Internal Motivation	.355**	.275**
Intuitive Use	.242**	.358**
Efficiency	.256**	.195**

**p<0.05, **p<0.01*

4.1.2 Issues during the virtual exchange

The online survey included questions related to problems, difficulties, and challenges of the virtual exchange, especially in relation to the local and international communication in Zoom in the breakout rooms. The research question was related to national differences in the perception of the synchronous session. The descriptive analysis showed that there were no significant differences (p>0.01) in the evaluation of such challenges which included (a) language issues, (b) organisational issues, (c) issues related to my local group, (d) issues related to the international group, and (e) communication issues in Zoom, Table 5 summarises the results of this part of the analysis.

Table 5. Issues descriptive statistics (Scale 1-5 with 1 = low, 5 = high) and country comparison.

Issue	***Mean***	***SD***	***Country***	***Mean***	***SD***	***t***	***df***
Language issues	2.54	1.22	Israel	2.58	1.13	.373	139
			Germany	2.50	1.32		
Organisational issues	2.77	1.17	Israel	2.65	1.10	-1.256	140
			Germany	2.90	1.24		
Issues related to my local group	1.90	1.14	Israel	1.76	1.04	-1.459	139
			Germany	2.04	1.23		
Issues related to the international group	2.17	1.16	Israel	2.18	1.03	-.12	140
			Germany	2.16	1.28		
Communication issues in zoom	2.17	1.26	Israel	2.03	1.08	-1.358	140
			Germany	2.31	1.41		

**p<0.05, **p<0.01*

4.2 Student perceptions about the design of the virtual exchange

Part III of the online survey included self-constructed items regarding Learning Design of the virtual exchange. Altogether 7 items were included in the survey to explore the perceptions of students related to the organisation of the exchange, which included number of synchronous sessions, duration of teachers' presentations (30 minutes), duration of the breakout room sessions (30 minutes), number of students in breakout rooms during the three meetings, and the amount of feedback in breakout rooms during each meeting. Another set of questions was asked about the content of the virtual exchange related to the project assignment (designing an online course), the content of both lectures, and the assignments in the three meetings. Finally, a set of questions was asked about willingness to participate in virtual exchanges in the future.

Students' perceptions regarding the learning design of the virtual exchange were measured using a 1-3 scale (too little, just right and too much). Israeli students prefer less meetings (M=2.26, SD=0.56) than their German counterparts (M=1.94, SD=0.37) [t(135)=-3.869, p<0.001]. Israeli students perceive the quality of the feedback given by the German students better in all 3 sessions compared to the perception of German students (Table 6). The observations of the facilitators were aligned to this result as it seemed that German students provided more and more structured feedback to students from Israel. In all other aspects, no significant differences were found.

Table 6. Descriptive statistics (Scale 1-3: 1 = too little, 2 = just right, 3 = too much).

Issue	***Mean***	***SD***	***Country***	***Mean***	***SD***	***t***	***df***
Amount of feedback in breakout rooms in meeting 1	2.54	1.22	Germany	1.66	.56	-2.647*	134
			Israel	1.91	.54		
Amount of feedback in breakout rooms in meeting 2	2.77	1.17	Germany	1.65	.53	-3.484*	134
			Israel	1.95	.48		
Amount of feedback in breakout rooms in meeting 3	1.90	1.14	Germany	1.72	.53	-3.046*	135
			Israel	1.98	.48		

**p<0.05, **p<0.01*

5 CONCLUSIONS

The key research question was related to the exploration of differences in the perception of students of the virtual exchange. The aim was to explore in what ways students with varying experience (in international contexts and in the English language) and from different localities (Germany and Israel) differed in the evaluation of their learning experiences during synchronous sessions, including interactions in breakout rooms. Comparison between localities (Israel and Germany) regarding the experience of the virtual exchange reveals there were very few differences. The only differences were the preferred number of meetings and the perception of the quality of feedback given by students at the foreign university. Differences were found regarding previous international experience and experience in using the English language. An interesting result was that students with more international experience showed higher values in all three factors related to the learning experience in the virtual exchange, i.e., internal motivation, higher intuitive use, and a higher efficiency. Students with more experience in using English also showed higher values related to internal motivation, intuitive use, and efficiency. Interestingly enough, the study revealed gender differences, which was not part of the research objective of the study. Slightly lower values were reached with female students in the factor “intuitive use”, which included friendliness, understanding and ease of the experience. It is an interesting finding, so future research could look more deeply into gender differences in virtual exchanges. The results of the study and the observations of the facilitators of the virtual exchange also show that breakout rooms in the conferencing system Zoom allowed to create online learning spaces which enhanced personal interaction and relationship-building in smaller international groups. Without the breakout rooms it would have been difficult to forge personal relationships in online settings in a large group of over 200 students. The results of the study indicate that the design of the structured group work in breakout rooms was valued by the students as an enhancer of the learning experience. Further studies could look more deeply into relationship-building in international teams in breakout rooms as initiated by [12]. When dealing with the design of learning experiences, one of the most important elements is to create meaningful learning interactions that relate to real world situations. Authentic learning experiences typically relate to the real world and complex problems in particular participation in virtual communities of practice [13].

ACKNOWLEDGEMENTS

This publication was produced as part of the open virtual exchange between Beuth University of Applied Sciences Berlin, Germany and the Academic College of Tel-Aviv Yaffo, Israel. We would like to acknowledge the support of participating departments and students at both universities.

REFERENCES

[1] R. O’Dowd, “From telecollaboration to virtual exchange: state-of-the-art and the role of UNICollaboration in moving forward,” *Journal of Virtual Exchange*, vol. 1, 1-23, 2018.

[2] G., Ubachs, P. Henderikx, “EADTU Mobility Matrix,” Maastricht, NL: EADTU, 2018. Retrieved from https://tinyurl.com/EADTU-mobility-matrix

[3] I. Buchem, F. Amenduni, A. Poce, V. Michaescu, D. Andone, G. Tur, S. Urbina, B. Smitek, “Integrating Mini-MOOCS into Study Programs in Higher Education During Covid-19. Five Pilot Case Studies in Context of the Open Virtual Mobility Project” in *Human and Artificial Intelligence for the Society of the Future. Inspiring Digital Education for the Next STE(A)M Student Generation,* (S. K. Softic, D. Andone, A. Szucs, eds.), Timisoara, Romania, European Distance and e-Learning Network (EDEN), 335-344, 2020.

[4] O. Firssova, K. Rajagopal, “OpenVM Competence Framework,” *OpenVM,* 2018. Retrieved from https://www.openvirtualmobility.eu/wp-content/uploads/2018/10/openVM_O1_A1_FINALOct2018.pdf

[5] D. Andone, M. Frydenberg, "Across Continents: Using Web Based Collaboration Tools for Learning," *IEEE 11th International Conference on Advanced Learning Technologies*, 100-102, 2011.

[6] I. Buchem, W. Reinhardt, T. van Treeck, M. Leiba, A. Perl, “Designing and Developing Mobile Learning Applications in International Student Teams,” *eLearning Papers No. 23*, 2013.

[7] P. Bassani Scherer, I. Buchem, “Virtual exchanges in higher education: developing intercultural skills of students across borders through online collaboration,” *Revista Interuniversitaria de Investigación en Tecnología Educativa (RIITE)*, vol. 6., 22-36, 2019.

[8] J. Biggs, “Enhancing teaching through constructive alignment,” *Higher Education*, 32, 347-364, 1996.

[9] S. Cordes, “Virtual team learning: The role of collaboration process and technology affordance in team decision making,” *Knowledge Management & E-Learning: An International Journal*, vol. 8, 602-627, 2016.

[10] B. Laugwitz, T. Held, M. Schrepp, “Construction and Evaluation of a User Experience Questionnaire” in *HCI and Usability for Education and Work*. *USAB*. *Lecture Notes in Computer Science* (Holzinger A. eds.), vol 5298, Springer, Berlin, Heidelberg, 63-76, 2008.

[11] J.F, Hair, R.L. Tatham, R.E. Anderson, W. Black, *Multivariate data analysis* (5th ed.). London: Prentice-Hall, 1998.

[12] K. Landrø, C.H. Krogstie, G.M. Roald, P. Wallin, “Relationship Building in Breakout Groups” in *Designing Courses with Digital Technologies* (Hrastinski, S., eds), New York, Routledge, 2021.

[13] W.C, Chang, H.J., Lee, C.Y., Wang, G.D., Chen, “Improving the authentic learning experience by integrating robots into the mixed-reality environment”, *Computers & Education 55,* 1572–1578, 2010.